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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,141	12/31/2003	Mineo Yamakawa	INTEL1130 (P15612)	7926

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EXAMINER

STADLER, REBECCA M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/750,141	Applicant(s) YAMAKAWA ET AL.	
	Examiner Rebecca M. Stadler	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 22 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8, 9, 11 and 14-40 is/are pending in the application.
 4a) Of the above claim(s) 22-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 9, 11-21, 39 and 40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-6, 8, 9, 11, and 14-40 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12/31/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Election/Restrictions

Claims 22-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 3/22/2006.

Response to Arguments

Applicant's arguments, see Remarks, filed 03/22/2006, with respect to the Objection and 112 rejections have been fully considered and are persuasive. The Objections and 112 rejections of the specification and the claims have been withdrawn.

Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 6, 8, 14, 18, 20, 21, 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by USP 6,401,526 to Dai.

As to claims 1, 8, 18, 20, 21, 39 and 40, Dai 526 discloses a mixture of inorganic chlorides (which serves to provide the metal catalyst particle), a long chain molecular polymer, and a solvent (see column 4, lines 8-20). The precursor mixture is on an alumina/silica matrix and the polymer is calcined in air, leaving behind iron-oxide (molybdenum is also disclosed) nanoparticles (see column 4, lines 21-57). The polymer is removed by the calcinations, which occurs at both 400° and 700° C (see column 5, lines 10-17). The nanoparticles serve as catalysts for CVD growth of carbon nanotubes (see column 4, lines 32-33). As can be seen in

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Figure 1, the catalyst is attached non-randomly to the conical silicon tip substrates (see also column 4, line 58 - column 5, line 9 and column 6, lines 15-20). The catalyst precursor of Dai is placed on the tip substrate after the polymer and catalyst nanoparticles are attached (see column 4, line 63 - column 5, line 9).

As to claims 5-6, Dai '526 appears to teach one or more nanoparticles on the block copolymer (see column 4, lines 21-37).

With regard to claim 14, Dai '526 Figure 1A depicts aligned polymer molecules on the substrate, wherein the polymers are in the precursor mix.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai '526, as applied to claim 1 above, and further in view of Herr 2004/0072994.

Dai '526 does not disclose the use of a polymer that is a peptide, protein or nucleic acid. Herr 2004/0072994 does disclose a method for producing nanotubes on a substrate with a catalyst attached to a moiety selected from the group of DNA, RNA, or proteins (see page 9, claims 47 and 50). It would have been obvious to use the polymers of Herr in the Dai process because Herr demonstrates that these polymers are effective for attaching catalysts.

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai '526,

As to claim 9, although Dai teaches attaching the polymer and nanoparticle catalyst before attaching it to the substrate, it would have been obvious to attach the nanoparticles at any point in the process prior to producing the carbon nanotubes.

As to claim 11, Figure 2D depicts carbon nanotubes with a uniform distance between each of the nanotubes.

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai '526 as applied to claims 1 and 14 above, and further in view of Chan 6,696,022.

As to claim 15, Dai '526 does not teach how it aligns the polymer molecules. Chan '022 does disclose molecular combing for polymer alignment (see column 3, lines 62-64) and optical tweezers for alignment (see column 4, lines 28-31). It would have been obvious to use the method of Chan to align the polymer molecules because it aligns the molecules as desired by Dai. As to claim 16, it would have been obvious to align the polymers with any method.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dai '526 as applied to claim 1 above, and further in view of the Bonard reference.

Dai does not disclose using ferretin as the catalyst for carbon nanotube production. The Bonard reference does disclose using ferretin as the catalyst for nanotube production. It would have been obvious to use the catalyst of Bonard in the Dai process because Bonard demonstrates that this catalyst catalyzes carbon nanotube production, which is the objective of Dai.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dai '526 as applied to claim 1 above, and further in view of Lieber 6,159,742.

Dai does not disclose using biotin-avidin or biotin-streptavidin to bind the polymers to the nanotubes. However, Lieber '742 teaches that biotin-streptavidin is useful for adhesion of nanotubes and functionalizing groups (including polypeptides and nucleic acids) (see column 8, lines 14-54). Lieber also teaches avidin for binding purposes. It would have been obvious to use the ligand-receptor complex of Lieber in the Dai process because Lieber demonstrates that it is an effective means of binding something to a carbon nanotube.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca M. Stadler whose telephone number is 571-272-5956.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

rms


COLLEEN P. COOKE
PRIMARY EXAMINER